



**Amino acid sequence alignment in human IgG isotypes
and their variants.**

| Human IgG Isotype | Amino Acid Position | | | | | |
|-------------------|---------------------|------------|-------|-------------|------------|--|
| | 228.....234 | 235 | 236 | 237.....330 | 331 | |
| G1 | Pro.....Leu | Leu | Gly | Gly.....Ala | Pro | |
| G2 | Pro.....Val | Ala | | Gly.....Ala | Pro | |
| G4 | Ser.....Phe | Leu | Gly | Gly.....Ser | Ser | |
| G1 variant | Pro..... Val | Ala | Gly | Gly.....Ala | Ser | |
| G2 variant | Pro.....Val | Ala | | Gly.....Ala | Ser | |
| G4 variant | ProPhe | Ala | Gly | Gly.....Ser | Ser | |

| ID number | Corresponding Row |
|--------------|-------------------|
| SEQ ID NO:26 | G1 |
| SEQ ID NO:27 | G2 |
| SEQ ID NO:28 | G4 |
| SEQ ID NO:22 | G1 variant |
| SEQ ID NO:18 | G2 variant |
| SEQ ID NO:20 | G4 variant |

FIG 1

DNA and deduced amino acid sequences of HuEPO-L-vFc_{γ2}

| DNA | SEQ NO. 17 |
|--|------------|
| Amino Acid Sequence | SEQ NO. 18 |
| aag ctt ggc gcg gag atg ggg gtg cac gaa tgt cct gcc tgg ctg tgg ctt ctc ctg tcc 60 | |
| HindIII M G V H E C P A W L W L L L S | |
| -27 | -20 |
| ctg ctg tcg ctc cct ctg ggc ctc cca gtc ctg ggc gcc cca cca cgc ctc atc tgt gac 120 | |
| L L S L P L G L P V L G A P P R L I C D | |
| -10 | -1 1 |
| agc cga gtc ctg gag agg tac ctc ttg gag gcc aag gag gcc gag aat atc acg acg ggc 180 | |
| S R V L E R Y L L E A K E A E N I T T G | |
| 10 | 20 |
| tgt gct gaa cac tgc agc ttg aat gag aat atc act gtc cca gac acc aaa gtt aat ttc 240 | |
| C A E H C S L N E N I T V P D T K V N F | |
| 30 | 40 |
| tat gcc tgg aag agg atg gag gtc ggg cag cag gcc gta gaa gtc tgg cag ggc ctg gcc 300 | |
| Y A W K R M E V G Q Q A V E V W Q G L A | |
| 50 | 60 |
| ctg ctg tcg gaa gct gtc ctg cgg ggc cag gcc ctg ttg gtc aac tct tcc cag ccg tgg 360 | |
| L L S E A V L R G Q A L L V N S S Q P W | |
| 70 | 80 |
| gag ccc ctg cag ctg cat gtg gat aaa gcc gtc agt ggc ctt cgc agc ctc acc act ctg 420 | |
| E P L Q L H V D K A V S G L R S L T T L | |
| 90 | 100 |
| ctt cgg gct ctg gga gcc cag aag gaa gcc atc tcc cct cca gat gcg gcc tca gct gct 480 | |
| L R A L G A Q K E A I S P P D A A S A A | |
| 110 | 120 |
| cca ctc cga aca atc act gct gac act ttc cgc aaa ctc ttc cga gtc tac tcc aat ttc 540 | |
| P L R T I T A D T F R K L F R V Y S N F | |
| 130 | 140 |
| ctc cgg gga aag ctg aag ctg tac aca ggg gag gcc tgc agg aca ggg gac gga tcc ggt 600 | |
| L R G K L K L Y T G E A C R T G D G S G | |
| 150 | 160 |
| ggc ggt tcc ggt gga ggc gga agc ggc ggt gga gga tca gag cgc aaa tgt tgt gtc gag 660 | |
| G G S G G G G S G G G G S E R K C C V E | |
| 170 | 180 |
| tgc cca ccg tgc cca gca cca cct gtg gca gga ccg tca gtc ttc ctc ttc ccc cca aaa 720 | |
| C P P C P A P P V A G P S V F L F P P K | |
| 190 | 200 |
| ccc aag gac acc ctc atg atc tcc cgg acc cct gag gtc acg tgc gtg gtg gtg gac gtg 780 | |
| P K D T L M I S R T P E V T C V V V D V | |
| 210 | 220 |
| agc cac gaa gac ccc gag gtc cag ttc aac tgg tac gtg gac ggc gtg gag gtg cat aat 840 | |
| S H E D P E V Q F N W Y V D G V E V H N | |
| 230 | 240 |
| gcc aag aca aag cca cgg gag gag cag ttc aac agc acg ttc cgt gtg gtc agc gtc ctc 900 | |
| A K T K P R E E Q F N S T F R V V S V L | |
| 250 | 260 |
| acc gtt gtg cac cag gac tgg ctg aac ggc aag gag tac aag tgc aag gtc tcc aac aaa 960 | |
| T V V H Q D W L N G K E Y K C K V S N K | |
| 270 | 280 |
| ggc ctc cca gcc tcc atc gag aaa acc atc tcc aaa acc aaa ggg cag ccc cga gaa cca 1020 | |
| G L P A S I E K T I S K T K G Q P R E P | |
| 290 | 300 |
| cag gtg tac acc ctg ccc cca tcc cgg gag gag atg acc aag aac cag gtc agc ctg acc 1080 | |
| Q V Y T L P P S R E E M T K N Q V S L T | |
| 310 | 320 |
| tgc ctg gtc aaa ggc ttc tac ccc agc gac atc gcc gtg gag tgg gag agc aat ggg cag 1140 | |
| C L V K G F Y P S D I A V E W E S N G Q | |
| 330 | 340 |
| ccg gag aac aac tac aag acc aca cct ccc atg ctg gac tcc gac ggc tcc ttc ttc ctc 1200 | |
| P E N N Y K T T P P M L D S D G S F F L | |
| 350 | 360 |
| tac agc aag ctc acc gtg gac aag agc agg tgg cag cag ggg aac gtc ttc tca tgc tcc 1260 | |
| Y S K L T V D K S R W Q Q G N V F S C S | |
| 370 | 380 |
| gtg atg cat gag gct ctg cac aac cac tac acg cag aag agc ctc tcc ctg tct ccg ggt 1320 | |
| V M H E A L H N H Y T Q K S L S L S P G | |
| 390 | 400 |
| aaa tga gaa ttc | 1332 |
| K EcoRI | |
| 409 | |

FIG 2A



DNA and deduced amino acid sequences of HuEPO-L-vFc_{γ4}

| DNA | SEQ NO. 19 |
|--|------------|
| Amino Acid Sequence | SEQ NO. 20 |
| aag ctt ggc gcg gag atg ggg gtg cac gaa tgt cct gcc tgg ctg tgg ctt ctc ctg tcc 60 | |
| HindIII M G V H E C P A W L W L L S | |
| -27 | -20 |
| ctg ctg tcg ctc cct ctg ggc ctc cca gtc ctg ggc gcc cca cca cgc ctc atc tgt gac 120 | |
| L L S L P L G L P V L G A P P R L I C D | |
| -10 | -1 1 |
| agc cga gtc ctg gag agg tac ctc ttg gag gcc aag gag gcc gag aat atc acg acg ggc 180 | |
| S R V L E R Y L L E A K E A E N I T T G | |
| 10 | 20 |
| tgt gct gaa cac tgc agc ttg aat gag aat atc act gtc cca gac acc aaa gtt aat ttc 240 | |
| C A E H C S L N E N I T V P D T K V N F | |
| 30 | 40 |
| tat gcc tgg aag agg atg gag gtc ggg cag cag gcc gta gaa gtc tgg cag ggc ctg gcc 300 | |
| Y A W K R M E V G Q Q A V E V W Q G L A | |
| 50 | 60 |
| ctg ctg tcg gaa gct gtc ctg cgg ggc cag gcc ctg ttg gtc aac tct tcc cag ccg tgg 360 | |
| L L S E A V L R G Q A L L V N S S Q P W | |
| 70 | 80 |
| gag ccc ctg cag ctg cat gtg gat aaa gcc gtc agt ggc ctt cgc agc ctc acc act ctg 420 | |
| E P L Q L H V D K A V S G L R S L T T L | |
| 90 | 100 |
| ctt cgg gct ctg gga gcc cag aag gaa gcc atc tcc cct cca gat gcg gcc tca gct gct 480 | |
| L R A L G A Q K E A I S P P D A A S A A | |
| 110 | 120 |
| cca ctc cga aca atc act gct gac act ttc cgc aaa ctc ttc cga gtc tac tcc aat ttc 540 | |
| P L R T I T A D T F R K L F R V Y S N F | |
| 130 | 140 |
| ctc cgg gga aag ctg aag ctg tac aca ggg gag gcc tgc agg aca ggg gac gga tcc ggt 600 | |
| L R G K L K L Y T G E A C R T G D G S G | |
| 150 | 160 |
| ggc ggt tcc ggt gga ggc gga agc ggc ggt gga gga tca gag tcc aaa tat ggt ccc cca 660 | |
| G G S G G G G S G G G G S E S K Y G P P | |
| 170 | 180 |
| tgc cca cca tgc cca gca cct gag ttc ggc ggc gga cca tca gtc ttc ctg ttc ccc cca 720 | |
| C P C P A P E F A G G G P S V F L F P P | |
| 190 | 200 |
| aaa ccc aag gac act ctc atg atc tcc cgg acc cct gag gtc acg tgc gtg gtg gtg gac 780 | |
| K P K D T L M I S R T P E V T C V V V D | |
| 210 | 220 |
| gtg agc cag gaa gac ccc gag gtc cag ttc aac tgg tac gtg gat ggc gtg gag gtg cat 840 | |
| V S Q E D P E V Q F N W Y V D G V E V H | |
| 230 | 240 |
| aat gcc aag aca aag ccg cgg gag gag cag ttc aac agc acg tac cgt gtg gtc agc gtc 900 | |
| N A K T K P R E E Q F N S T Y R V V S V | |
| 250 | 260 |
| ctc acc gtc ctg cac cag gac tgg ctg aac ggc aag gag tac aag tgc aag gtc tcc aac 960 | |
| L T V L H Q D W L N G K E Y K C K V S N | |
| 270 | 280 |
| aaa ggc ctc ccg tcc tcc atc gag aaa acc atc tcc aaa gcc aaa ggg cag ccc cga gag 1020 | |
| K G L P S S I E K T I S K A K G Q P R E | |
| 290 | 300 |
| cca cag gtg tac acc ctg ccc cca tcc cag gag gag atg acc aag aac cag gtc agc ctg 1080 | |
| P Q V Y T L P P S Q E M T K N Q V S L | |
| 310 | 320 |
| acc tgc ctg gtc aaa ggc ttc tac ccc agc gac atc gcc gtg gag tgg gag agc aat ggg 1140 | |
| T C L V K G F Y P S D I A V E W E S N G | |
| 330 | 340 |
| cag ccg gag aac aac tac aag acc acg cct ccc gtg ctg gac tcc gac ggc tcc ttc ttc 1200 | |
| Q P E N N Y K T T P P V L D S D G S F F | |
| 350 | 360 |
| ctc tac agc agg cta acc gtg gac aag agc agg tgg cag gag ggg aat gtc ttc tca tgc 1260 | |
| L Y S R L T V D K S R W Q E G N V F S C | |
| 370 | 380 |
| tcc gtg atg cat gag gct ctg cac aac cac tac aca cag aag agc ctc tcc ctg tct ctg 1320 | |
| S V M H E A L H N H Y T Q K S L S L S L | |
| 390 | 400 |
| ggg aaa tga gaa ttc 1335 | |
| G K EcoRI | |
| 410 | |

FIG 2B



DNA and deduced amino acid sequences of HuEPO-L-vFc₁

| DNA | SEQ NO. 21 |
|---|---|
| Amino Acid Sequence | SEQ NO. 22 |
| aag ctt_ggc gcg gag atg ggg gtg cac gaa tgt cct gcc tgg ctg tgg ctt ctc ctg tcc 60 | |
| HindIII | M G V H E C P A W L W L L L S |
| -27 | -20 |
| ctg ctg tgc ctc cct ctg ggc ctc cca gtc ctg gcc gcc cca cca cgc ctc atc tgt gac 120 | L L S L P L G L P V L G A P P R L I C D |
| -10 | -1 1 |
| agc cga gtc ctg gag agg tac ctc ttg gag gcc aag gag gcc gag aat atc acg acg ggc 180 | S R V L E R Y L L E A K E A E N I T T G |
| 10 | 20 |
| tgt gct gaa cac tgc agc ttg aat gag aat atc act gtc cca gac acc aaa gtt aat ttc 240 | C A E H C S L N E N I T V P D T K V N F |
| 30 | 40 |
| tat gcc tgg aag agg atg gag gtc ggg cag cag gcc gta gaa gtc tgg cag ggc ctg gcc 300 | Y A W K R M E V G Q Q A V E V W Q G L A |
| 50 | 60 |
| ctg ctg tgc gaa gct gtc ctg cgg gcc cag gcc ctg ttg gtc aac tct tcc cag ccg tgg 360 | L L S E A V L R G Q A L L V N S S Q P W |
| 70 | 80 |
| gag ccc ctg cag ctg cat gtg gat aaa gcc gtc agt gcc ctt cgc agc ctc acc act ctg 420 | E P L Q L H V D K A V S G L R S L T T L |
| 90 | 100 |
| ctt cgg gct ctg gga gcc cag aag gaa gcc atc tcc cct cca gat gcg gcc tca gct gct 480 | L R A L G A Q K E A I S P P D A A S A A |
| 110 | 120 |
| cca ctc cga aca atc act gct gac act ttc cgc aaa ctc ttc cga gtc tac tcc aat ttc 540 | P L R T I T A D T F R K L F R V Y S N F |
| 130 | 140 |
| ctc cgg gga aag ctg aag ctg tac aca ggg gag gcc tgc agg aca ggg gac gga tcc ggt 600 | L R G K L K L Y T G E A C R T G D G S G |
| 150 | 160 |
| ggc ggt tcc ggt gga ggc gga agc ggc ggt gga gga tca gac aaa act cac aca tgc cca 660 | G G S G G G G S G G G G S D K T H T C P |
| 170 | 180 |
| ccg tgc cca gca cct gaa <u>gtc</u> <u>gcg</u> ggg gga ccg tca gtc ttc ctc ttc ccc cca aaa ccc 720 | P C P A P E <u>V</u> <u>A</u> G G P S V F L F P P K P |
| 190 | 200 |
| aag gac acc ctc atg atc tcc cgg aca cct gag gtc aca tgc gtg gtg gtg gac gtg agc 780 | K D T L M I S R T P E V T C V V V D V S |
| 210 | 220 |
| cac gaa gac cct gag gtc aag ttc aac tgg tac gtg gac ggc gtg gag gtg cat aat gcc 840 | H E D P E V K F N W Y V D G V E V H N A |
| 230 | 240 |
| aag aca aag ccg cgg gag gag cag tac aac agc acg tac ccg gtg gtc agc gtc ctc acc 900 | K T K P R E E Q Y N S T Y R V V S V L T |
| 250 | 260 |
| gtc ctg cac cag gac tgg ctg aat ggc aag gag tac aag tgc aag gtc tcc aac aaa gcc 960 | V L H Q D W L N G K E Y K C K V S N K A |
| 270 | 280 |
| ctc cca gcc <u>tcc</u> atc gag aaa acc atc tcc aaa gcc aaa ggg cag ccc cga gaa cca cag 1020 | L P A <u>S</u> I E K T I S K A K G Q P R E P Q |
| 290 | 300 |
| gtg tac acc ctg ccc cca tcc cgg gat gag ctg acc aag aac cag gtc agc ctg acc tgc 1080 | V Y T L P P S R D E L T K N Q V S L T C |
| 310 | 320 |
| ctg gtc aaa ggc ttc tat ccc agc gac atc gcc gtg gag tgg gag agc aat ggg cag ccg 1140 | L V K G F Y P S D I A V E W E S N G Q P |
| 330 | 340 |
| gag aac aac tac aag acc acg cct ccc gtg ctg gac tcc gac ggc tcc ttc ttc ctc tac 1200 | E N N Y K T T P P V L D S D G S F F L Y |
| 350 | 360 |
| agc aag ctc acc gtg gac aag agc agg tgg cag cag ggg aac gtc ttc tca tgc tcc gtg 1260 | S K L T V D K S R W Q Q G N V F S C S V |
| 370 | 380 |
| atg cat gag gct ctg cac aac cac tac acg cag aag agc ctc tcc ctg tct ccg ggt aaa 1320 | M H E A L H N H Y T Q K S L S L S P G K |
| 390 | 400 |
| tga gaa ttc | 1329 |
| EcoRI | |

FIG 2C